The Effect of Repositioning Maneuvers on Quality of Life, Vertigo Symptoms and Dizziness in Patients with Benign Paroxysmal Positional Vertigo

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Abstract

Aim: The aim of this study is to evaluate the effect of repositioning maneuvers on quality of life, vertigo symptoms and dizziness in patients diagnosed with BPPV through Dix-Hallpike and Head Roll maneuvers. Methods: The study included 67 patients diagnosed with BPPV through Dix- Hallpike and Head Roll maneuvers. The vertigo dizziness imbalance scale, dizziness handicap inventory and visual analog scale were applied before and one week after repositioning maneuvers (to those whose nystagmus completely disappeared). Results: A statistically significant difference was determined in the scores obtained from the Dizziness Handicap Inventory (physical, functional and emotional and total scores), Vertigo Imbalance Scale (Quality of life and Symptom scores) and visual analog scale after repositioning maneuvers ($p<0.05$). Conclusion: This study revealed the positive effects of repositioning maneuvers on quality of life, vertigo symptoms and dizziness in patients with BPPV.

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Abstract

Objectives: The aim of this study is to evaluate the effect of repositioning maneuvers on quality of life, vertigo symptoms and dizziness in patients diagnosed with BPPV through Dix-Hallpike and Head Roll maneuvers.

Design: The vertigo dizziness imbalance scale, dizziness handicap inventory and visual analog scale were applied before and one week after repositioning maneuvers (to those whose nystagmus completely disappeared).

Setting: A single specialist university hospital.

Participants : The study included 67 patients diagnosed with BPPV through Dix- Hallpike and Head Roll maneuvers

Main outcome measures: Of the patients included in the study, 29 were diagnosed with posterior canal canalithiasis and 8 were diagnosed with posterior canal cupulolithiasis according to the affected side when they met the following criteria in the Dix-Hallpike maneuver with VNG. Repositioning maneuvers were performed on the patients diagnosed with BPPV

Results: A statistically significant difference was determined in the scores obtained from the Dizziness Handicap Inventory (physical, functional and emotional and total scores), Vertigo Imbalance Scale (Quality of life and Symptom scores) and visual analog scale after repositioning maneuvers ($p<0.05$).

Conclusion: This study revealed the positive effects of repositioning maneuvers on quality of life, vertigo symptoms and dizziness in patients with BPPV.

Keywords: BPPV, dizziness, repositioning maneuvers, quality of life, vertigo symptoms

KEY POINTS

- Vertigo, dizziness and imbalance are frequent symptoms among patients in clinical practice.
- Vertigo is a health problem that greatly affects the quality of life.
- The dizziness handicap inventory provides a useful and reliable with dizziness.
- Literature suggest that the Vertigo Imbalance Scale questionnaire is a reliable, valid and responsive instrument for patients with vertigo, dizziness or imbalance.
- Repositioning maneuvers have positive effects on quality of life, vertigo symptoms and dizziness in patients with BPPV.

INTRODUCTION

Vertigo is divided into two as central and peripheral. Although central vertigo is accompanied by neurological symptoms such as diplopia, dysarthria, coordination disorder, drowsiness and weakness, the symptoms are milder but last longer than peripheral vertigo. More than 90% of peripheral vertigo cases consist of benign paroxysmal positional vertigo (BPPV), acute peripheral vestibulopathy and Meniere's disease[1]. BPPV is the most common among these diseases. BPPV is diagnosed in 17-42% of patients exhibiting symptoms of peripheral dizziness . In BPPV, dizziness attacks lasting for seconds occur during the angular acceleration motions of the head, but the disease is completely asymptomatic between the attacks. Dizziness that occurs during attacks can be accompanied by symptoms such as imbalance, nausea and vomiting. As a result of these symptoms, the quality of life of the patient is considerably affected [2].

Although the symptoms of BPPV can resolve spontaneously, they may last for days, weeks, months or years and even recur.

When patients with positional vertigo are analyzed, it is seen that the incidence of BPPV affecting the posterior or horizontal canal is more frequent. Of the BPPV cases, about 85-90% are considered to be of posterior canal origin, while approximately 5-15% are considered to be of horizontal canal origin [3]. The incidence of BPPV subtypes in which the anterior canal and multiple canals are affected, is seen to be less than 5% of the cases [4]. When determining the affected channel in BPPV, the patient's history and the features of the nystagmus that occur during the diagnostic maneuvers also have an important place in the diagnosis . While the diagnostic maneuvers of BPPV include the Dix–Hallpike and side-lying maneuvers for vertical channels and head roll maneuvers for lateral channels, the canalith repositioning maneuvers include the Epley and Semont maneuvers for vertical channels and the Barbecue and Gufoni maneuvers for lateral channels [5].

The aim of this clinical study is to evaluate the effect of repositioning maneuvers on quality of life, vertigo symptoms and dizziness in patients admitted to our clinic and diagnosed with BPPV.

MATERIALS AND METHODS

This study was designed as a prospective study. The study included patients who were admitted to the Faculty of Medicine, Department of Otorhinolaryngology, in a local University between November 2019 and February 2020. A total of 67 patients aged 18-65 years, who underwent routine ENT examinations and diagnosed with benign paroxysmal positional vertigo (BPPV) as a result of medical history and positional tests, were included. Patients who were not previously treated with a maneuver for dizziness, had no history of ototoxic drug use and had normal hearing were included in the study. Patients with Meniere's disease, migraine-associated dizziness, vertebrobasilar insufficiency, postural hypotension, neurological or systemic

disease, and traumatic BPPV were excluded from the study. Of the patients included in the study, 29 were diagnosed with posterior canal canalithiasis and 8 were diagnosed with posterior canal cupulolithiasis according to the affected side when they met the following criteria in the Dix-Hallpike maneuver with VNG: the presence of rotational nystagmus lasting less than 60 seconds in the counterclockwise direction when the right ear is downward and in the clockwise direction when the left ear is downward after a latency period of 10-15 sec; the presence of rotational nystagmus usually lasting longer than 60 sec in the counterclockwise direction when the right ear is downward and in the clockwise direction when the left ear is downward with no latency period; the development of reverse nystagmus when the patient is placed in the sitting position [6].

Of the patients, 14 were diagnosed with lateral canal canalithiasis and 16 were diagnosed with lateral canal cupulolithiasis according to the affected side when they met the following criteria in the Head Roll maneuver with videonystagmography: the presence of nystagmus, which is geotropic nystagmus decaying in a short time, when the right ear or left ear is downward after a latent period of 10-15 seconds; the presence of nystagmus, which is ageotropic nystagmus lasting longer than geotropic nystagmus, when the right ear or left ear is downward with no latency period; and the presence of simultaneous vertigo with nystagmus[7].

After 10-15 minutes of resting following the maneuvers, the patients filled in the Demographic Data Form, Vertigo Dizziness Imbalance Scale, Dizziness Handicap Inventory, and visual analog scale forms. After 1 week, the diagnostic positional tests were performed again with videonystagmography and the same forms were again filled by the patients whose tests were negative.

The "Dizziness Handicap Inventory" (DHI) used in our study is a method used to evaluate the efficacy of otoneurological treatments[8]. The Dizziness Handicap Inventory is a scale consisting of 25 questions that evaluates the quality of life physically, functionally and emotionally in individuals with dizziness. The DHI consists of three subscales: physical (7 questions), emotional (9 questions) and functional (9 questions). The maximum score that can be taken from the scale is 100 points. A high score indicates that dizziness has a high impact on the patient's quality of life. The other scale used in our study is the "Vertigo Dizziness Imbalance Scale". This scale consists of two subscales. These are symptom scale and quality of life scale. The symptom scale consists of 14 items, while the quality of life scale consists of 22 items [9]. Using the visual analog scale, the global quality of life of the patients was numerically evaluated between 0 (best) and 10 (worst).

Repositioning maneuvers were performed on the patients diagnosed with BPPV. The repositioning maneuvers included the Epley maneuver for those diagnosed with posterior canal canalolithiasis, the Semont maneuver for those diagnosed with posterior canal cupulolithiasis, the Barbecue maneuver for those diagnosed with lateral canal canalolithiasis, the Gufoni maneuver for those diagnosed with lateral canal cupulolithiasis, followed by the Barbecue maneuver for canalolithiasis[10].

The approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of a local University Institute of Health Sciences (decision number: 2019/397) and consent was obtained from all individuals participating in the study.

Statistical Analysis

The data obtained were analyzed by using the SPSS (Statistical Program in Social Sciences) version 21 software. The normality of the data was tested by the Shapiro-Wilk test [11]. The level of significance for comparison tests was determined as (p) 0.05. In the variables with two groups (gender, hearing loss, tinnitus, nausea, vomiting, and fall history), the differences between the groups for the DHI, QOLS, VDI-SS were analyzed with the Mann-Whitney U Test. In the variables with multiple groups (age and BPPV), the differences between the groups for DHI, QOLS, VDI-SS were analyzed with the Kruskal Wallis test. The scores obtained from the scales before and after the maneuvers were compared by using the Wilcoxon signed-rank test.

RESULTS

The distribution of patients included in the study according to demographic variables is summarized in Table 1.

Of the patients participating in the study, 50.7% (n=34) were female and 49.3% (n=33) were male. Of the patients, 35.8% (n=24) were in the 44-55 age group. It was found that of the patients, 43.3% (n=29) were diagnosed with posterior canal canalolithiasis, 19.4% (n=13) had hearing loss, 26.9% (n=18) had tinnitus, 67.2% (n=45) had nausea, 23.9% (n=16) had vomiting and 7.5% (n=5) had a history of fall.

In the statistical analysis carried out for the pre- and post-repositioning scale scores of the patients, there was a statistically significant difference between the mean scores of DHI and all its subscales (physical, functional and emotional) ($p<0.05$).

The mean pre-repositioning DHI and physical, functional, and emotional subscale scores were higher compared to the post-repositioning scores, which was statistically significant ($p<0.05$).

There was a statistically significant difference between the mean pre- and post-repositioning VDI-QOLS and VDI-SS scores ($p<0.05$). In both scales, the mean pre-repositioning scores were lower than the post-repositioning scores, which was statistically significant ($p<0.05$).

There was a statistically significant difference between the mean pre- and post-repositioning dizziness intensity scores ($p<0.05$). The mean pre-repositioning score was higher than the mean post-repositioning score, which was statistically significant ($p<0.05$).

The results of the pre- and post-repositioning DHI, VDI-QOLS and VDI-SS scores are summarized in Table 2.

DISCUSSION

Although the ages of the patients included in our study ranged between 18-65, it was found that a significant portion of the patients was in the 44-55 age range (35.8%, n=24) [12,13]. In line with the literature, it was found that the incidence of BPPV in our study increased with increasing age [14]. Given the gender distribution of patients, there was no statistically significant difference between the two genders. Although results similar to our study have been reported in the literature, some studies have reported that BPPV is more common among women than in men[12,14]. Considering the symptoms of the patients, the presence of nausea in 67.2% (n=45), vomiting in 23.9% (n=16), and history of fall in 7.5% (n=5) of the patients show similar rates with the studies in the literature [15,16]. These symptoms arising when the vestibular system is affected are evaluated as the results of BPPV.

In accordance with the literature, the diagnosis was determined to be posterior canal canalolithiasis in 43.3% (n=29) of the patients diagnosed with BPPV in our study [3]. The highest incidence of BPPV in the posterior canal is due to its anatomical position. In addition to the posterior canal canalolithiasis group, 11.9% (n=8) of the cases were diagnosed with posterior canal cupulolithiasis, 20.9% (n=14) with lateral canal canalolithiasis, and 23.9% (n=16) with lateral canal cupulolithiasis. The rate of diagnosis of lateral canal pathologies (canalolithiasis/cupulolithiasis) is found to be very low in some studies in the literature[17,18], while in some studies, the rate of diagnosis of lateral canal pathologies (canalolithiasis/cupulolithiasis) is found to be much higher, as in our study. These high rates are believed to be associated with the use of the VNG for the diagnosis of BPPV in recent years. The use of VNG prevents missing lateral canal pathologies. Thus, higher rates of diagnosis are achieved compared to previous years[3,4]. The incidence of hearing loss in 19.4% (n=13) and tinnitus in 26.9% (n=18) of the patients in our study is consistent with the studies in the literature. However, these symptoms are considered not to be directly associated with BPPV [19].

In line with the literature, it was found in our study that there was a statistically significant decrease in the post-repositioning scores of DHI and all subscales of the scale (physical, functional and emotional)[20]. It is thought that the considerable reduction in the negative feelings of individuals is caused by the efficacy of the repositioning maneuvers on the BPPV pathology .

In our study, there was a statistically significant decrease in the post-repositioning dizziness intensity (VAS) scores. When the literature is reviewed, the statistically significant decrease in the VAS scores in various studies including BPPV patients diagnosed with posterior canal canalolithiasis [21], patients diagnosed with BPPV[19] and patients with subjective BPPV is similar to our study.

The patients in our study got the highest scores from the functional, emotional and physical subscales of the DIH before and after repositioning maneuvers, respectively. Contrary to our study, Whitney et al. reported that there was no statistically significant difference among the subscale scores of the DIH in patients diagnosed with BPPV[22]. In some of the studies, the highest scores taken from the subscales were physical, functional and emotional groups, respectively [20]. Some of the studies reported that patients with BPPV got the pre- and post-repositioning highest scores from the physical subscale [23]. When we compared the scores obtained from the subscales of the DIH in the literature review, similar and different aspects were determined with our study. In the literature, it is thought that the differences in the scores obtained from the subscales of the DIH may be related to the differences of the regions where the studies were conducted and the sociocultural levels and educational levels of patients.

It was found in our study that the total mean scores obtained from the VDI-QOL and VDI-SS increased statistically significantly after repositioning maneuvers. The fact that the study by Kulcu et al. (2008) found statistically significant positive improvements in quality of life of individuals diagnosed with BPPV after repositioning maneuvers and vestibular rehabilitation exercises supports our study .

Given the literature, it was found that patients diagnosed with BPPV showed statistically significant positive improvements in their vertigo symptoms after repositioning maneuvers and vestibular rehabilitation exercises. These results demonstrate the strong effect of reposition maneuvers on quality of life and vertigo symptoms[24,25].

CONCLUSION

Our study revealed that repositioning maneuvers positively affected the quality of life of patients with BPPV and reduced the symptoms of vertigo and dizziness. Since our study was conducted with videonystagmography, we were able to more accurately identify the subtypes of BPPV. For further studies, it will be useful to compare the subtypes of BPPV in terms of variables such as quality of life, symptoms of vertigo and dizziness levels by studying on a larger sample group with videonystagmography.

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Table 1. Distribution of Demographic Variables (n=67)

Variables	Variables	Number (n)	Percentage (%)
Gender	Male	33	49.3
	Female	34	50.7
Age	18-30 years	10	14.9
	31-43 years	19	28.4
	44-55 years	24	35.8
	57 years and above	14	20.9
BPPV Type	Posterior Canal Canalolithiasis	29	43.3
	Posterior Canal Cupulalithiasis	8	11.9
	Lateral Canal Canalolithiasis	14	20.9
	Lateral Canal Cupulalithiasis	16	23.9
Hearing Loss	No	54	80.6
	Yes	13	19.4
Tinnitus	No	49	73.1
	Yes	18	26.9
Nausea	No	22	32.8
	Yes	45	67.2
Vomiting	No	51	76.1
	Yes	16	23.9
Fall History	No	62	92.5
	Yes	5	7.5

Table 2: Comparison of Pre- and Post-Repositioning Scale Scores

Measurement Variables	Mean	SD	Lowest	Highest	Median	p value
Pre-DHI	75.88	10.144	52	96	76.00	0.001*
Post-DHI	10.46	7.968	0	46	10.00	
Pre-DHI Physical	25.58	2.797	16	28	26.00	0.001*
Post-DHI Physical	3.69	2.950	0	12	4.00	
Pre-DHI Functional	32.00	3.303	22	36	32.00	0.001*
Post-DHI Functional	3.94	3.171	0	14	4.00	
Pre-DHI Emotional	18.30	6.617	6	32	18.00	0.001*
Post-DHI Emotional	2.84	3.306	0	20	2.00	
Pre-VDI-QOLS	32.64	14.584	5	71	29.00	0.001*
Post-VDI-QOLS	93.10	9.249	57	108	95.00	
Pre-VDI-SS	21.30	11.981	2	56	19.00	0.001*
Post-VDI-SS	65.48	4.446	51	70	66.00	

Pre-VAS Score	8.52	1.700	4	10	9	0.001*
Post-VAS Score	1.06	0.903	0	4	1	

*p<0.05 DHI = Dizziness Handicap Inventory, VDI = Vertigo Dizziness Imbalance Scale,

QOL = Quality of Life Scale, SS= Symptom Scale, VAS= Visual Analog Scale